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(54) INK JET RECORDING SHEET AND ITS PRODUCTION

(57)Abstract:

PROBLEM TO BE SOLVED: To provide an ink jet recording sheet excellent in glossiness, color forming properties, high humidity preservability, printing density, ink absorbability and water resistance.

SOLUTION: An ink jet recording sheet is obtained by providing an ink receiving layer on a support and the ink receiving layer has layered constitution of one or more layer and at least one layer contains colloid particles with an average particle size of 300nm or less and a cationic resin. As colloid particles, anionic colloidal silica is especially pref.

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CLAIMS

[Claim(s)]

[Claim 1] The sheet for ink jet record characterized by containing the colloidal particle in which this ink absorbing layer has the lamination of one or more layers, and at least one layer has a mean diameter 300nm or less in the sheet for ink jet record which established the ink absorbing layer in the base material, and cationic resin.

[Claim 2] The sheet for ink jet record according to claim 1 characterized by a colloidal particle being anionic.

[Claim 3] The sheet for ink jet record according to claim 1 or 2 characterized by a colloidal particle being colloidal silica.

[Claim 4] The sheet for ink jet record according to claim 1, 2, or 3 characterized by the layer containing a colloidal particle and cationic resin occupying 50 - 100% of total ink absorbing layer weight.

[Claim 5] The sheet for ink jet record according to claim 1, 2, 3, or 4 whose weight ratios of a colloidal particle and cationic resin are 100 / 0.5 - 100/20.

[Claim 6] The manufacture approach of the sheet for ink jet record characterized by applying the application liquid which added cationic resin after mixing the colloidal particle and water soluble resin with which at least one layer of this ink absorbing layer has a mean diameter 300nm or less in the sheet for ink jet record which established the ink absorbing layer in the base material.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] Especially this invention relates to the sheet for ink jet record which is excellent in glossiness, color enhancement, ink absorptivity, highly humid shelf life, and a water resisting property about the sheet for ink jet record.

[0002]

[Description of the Prior Art] An ink jet recording method is a method which the liquid ink drop injected at high speed is made to adhere to a recorded material, and records it from a nozzle, and has the descriptions, like full-color-izing being easy and the printing noise are low. By this method, since the ink used is anionic, in order to usually obtain moisture-proof and the water resisting property after printing, the cationic matter is added by the recorded material (inside of an ink absorbing layer). However, since the color enhancement after printing changes greatly with cationic matter, selection and loadings of the cationic matter serve as the very important point on the design of the recorded material for ink jets.

[0003] Many common coated paper types are marketed as a sheet for ink jet record.

Porous pigments (being a secondary particle generally for example, a synthetic silica, an alumina, a calcium carbonate, etc.), or the fine particles and cationic resin of an ultrafine

particle contains the ink absorbing layer of these coated paper as indicated by JP,1-225585,A, JP,2-188287,A, JP,6-183134,A, JP,7-032725,A, JP,7-149037,A, etc. In the printing field, about the same printed matter as a photograph with which color enhancement is good with printed matter and high gloss has it for various publications or a package application is called for as rapid spread and the resolution of an ink jet printer become good. However, the detailed pigment (also including an ultrafine particle) used for a common coated paper type is a secondary particle, and condensation progresses further by putting in cationic resin. For this reason, it is impossible to obtain a paint film with transparency or smooth nature, and the glossy sheet for ink jet record was not able to be obtained.

[0004] Although many record sheets for ink jets which applied the resin which absorbs ink by dissolving or swelling were marketed, and a certain amount of [such a record sheet] gloss was acquired, since the resin of a hydrophilic property was used in order to make ink absorb, smeariness and the rate of drying of ink which becomes empty are also slow, and moisture-proof and a water resisting property did not have good resin, either.

[0005] Moreover, in order to acquire smooth nature and glossiness, an ink absorbing layer is prepared more than two-layer, and using the upper layer as a gloss manifestation layer is proposed (JP,7-101142,A, JP,7-117335,A, etc.). The complex of colloidal silica or colloidal silica is used as a principal component of these gloss manifestation layers. However, these gloss manifestation layers are obtained by cast processing (it is stuck to the mirror plane roll with which a gloss manifestation layer is a damp or wet condition, and was heated by pressure, and comes to carry out specular-gloss finishing), and are prepared rather than ink absorptivity for gloss. In order to enlarge an ink transit rate, the amount of applications of a cast layer needed to be lessened and the gloss at the time of a blank paper had the problem from which the printing gloss in which ink was [top / gloss manifestation layer] excellent in the wrap sake is not acquired after printing of a certain thing. The gloss with especially gloss of a photograph tone was not acquired. Moreover, a thing anionic in the colloidal particle used for a gloss manifestation layer is most, and the anionic colloidal particle itself did not have ink fixable.

[0006] As shown in JP,7-89220,A etc., an anionic colloidal particle is prepared as the upper layer, and the approach of stopping ink in the ink fixing layer (lower layer) which has a big secondary particle (for example, silica powder, alumina powder) and cationic resin is used. However, the particle size of an ink fixing layer was large, and smooth nature is not only bad, but since the ink fixing layer itself was not transparent at all, it was not able to obtain high gloss.

[0007] Using cation denaturation colloidal silica for JP,7-101142,A and JP,7-117335,A is indicated. Although cation denaturation colloidal silica is what the compound of polyvalent metal ion, such as aluminum ion, was made to react, and was obtained and the ink (the direct blue 199, hood black 72 grade) with sufficient color enhancement with a metal ion is good, color enhancement with a metal ion is not suitable for bad ink (for example, : red, such as acid red 52 (Food Red No106)). Moreover, when saved under highly humid, ink not only spreads, but the color had the problem by which it is faded considerably.

[0008] Moreover, the example which uses colloidal particles, such as pseudo-boehmite and alumina sol, was seen, and (JP,2-139275,A, JP,4-263983,A, JP,5-32413,A, JP,5-32414,A, JP,6-297831,A, JP,6-199035,A) highly humid shelf life was not [this as well as

cation denaturation colloidal silica was not suitable for bad color-enhancing ink with alumina ion and] good, either.

[0009]

[Problem(s) to be Solved by the Invention] When making an ink absorbing layer contain a cationic colloidal particle, remainder also has few classes of cationic colloidal particle, and it is difficult to cation-ize the colloidal particle which is anionic. Since there are also few cation radicals (aluminum ion etc.) which can carry out [cation]-izing even if cation-izing is possible, generally, as for ink, coloring changed with cation agents, coloring of ink is decided by the cationicity and a cationic colloidal particle cannot be dealt with the marketed various ink with it. Moreover, in these cationic colloidal particle independent, there was a problem from which highly humid shelf life is not fully acquired.

[0010] This invention solves these problems, and color enhancement and highly humid shelf life are more good, and it aims at offering high gloss and the sheet for ink jet record with which high-concentration record is acquired. The sheet for record which this invention could respond to various requests, such as gloss serious consideration, waterproof serious consideration, shelf-life serious consideration, and price serious consideration, and was excellent in color enhancement and highly humid shelf life is offered. Moreover, a water resisting property, ink fixable, and printing fitness offer the good sheet for high gloss ink jet record.

[0011]

[Means for Solving the Problem] This invention is the sheet for ink jet record which prepared the colloidal particle and cationic resin content layer which have a specific particle size. And the class of cationic resin can choose specific cationic resin to various ink, can be added to an ink absorbing layer, can solve a color-enhancing problem by this, and can also solve highly humid shelf life with a class and an addition.

[0012] If cationic resin is blended into the colloidal particle which generally has anionic, a colloidal state will collapse and a colloidal particle will condense. Since the particle condensed although it was available as common coated paper when the condensed liquid was applied, it was impossible to have obtained the sheet for ink jet record which smooth nature and transparency are spoiled and has a feeling of gloss.

[0013] In the desirable mode of this invention, a colloidal particle is anionic. The ink jet sheet excellent in high gloss, a water resisting property, color enhancement, and highly humid shelf life is obtained by condensation taking place, if an anionic colloidal particle and cationic resin are blended as mentioned above, and a colloidal particle's hardly condensing, obtaining uniform dispersion liquid, and applying it, if water soluble resin is made to stick to an anionic colloidal particle front face in the desirable mode of this invention and cationic resin is added behind, although a transparent and glossy paint film is not obtained.

[0014] It becomes there are many classes of anionic colloidal particle and possible to correspond to various requests (gloss serious consideration, waterproof serious consideration, shelf-life serious consideration, price serious consideration, etc.) by choosing suitably. Color enhancement and highly humid shelf life are improvable with selection of cationic resin.

[0015] Furthermore, if anionic colloidal silica is used as a colloidal particle, the ink absorbing layer which combines high-glossiness and high ink absorptivity will be

obtained.

[0016] It is possible for the feeling of transparency of the printing section to be obtained if the amount of applications of the layer containing a colloidal particle and cationic resin carries out to 50% - 100% of all ink absorbing layers, and to acquire about the same gloss as a photograph. Furthermore, if it imprints on a base material through an interlayer after carrying out application membrane formation of the ink absorbing layer of this invention in a molding side, gloss will improve remarkably and the sheet for ink jet record with more good high smoothing, high gloss, and color enhancement will be obtained.

[0017] Although this invention includes the following aspects, it is not restricted to these. [1] The sheet for ink jet record characterized by containing the colloidal particle in which this ink absorbing layer has the lamination of one or more layers, and at least one layer has a mean diameter 300nm or less in the sheet for ink jet record which established the ink absorbing layer in the base material, and cationic resin.

[0018] [2] The sheet for ink jet record given in [1] characterized by a colloidal particle being anionic.

[3] [1] characterized by a colloidal particle being colloidal silica, or the sheet for ink jet record given in [2].

[0019] [4] [1] characterized by the layer containing a colloidal particle and cationic resin occupying 50 - 100% of total ink absorbing layer weight, [2], or the sheet for ink jet record given in [3].

[0020] [5] The sheet for ink jet record of [1], [2], [3], or [4] publications whose weight ratios of a colloidal particle and cationic resin are 100 / 0.5 - 100/20.

[0021] [6] The manufacture approach of the sheet for ink jet record characterized by applying the application liquid which added cationic resin after mixing the colloidal particle and water soluble resin with which at least one layer of this ink absorbing layer has a mean diameter 300nm or less in the sheet for ink jet record which established the ink absorbing layer in the base material.

[0022] [7] The sheet for ink jet record of [1], [2], [3], [4], or [5] publications in which an ink absorbing layer contains a water-soluble-resin binder.

[8] [1] characterized by a base material coming to imprint through the interlayer who has adhesiveness or an adhesive property after carrying out application membrane formation of the ink absorbing layer in a molding side, [2], [3], [4], or the sheet for ink jet record given in [5].

[0023] [9] A water-soluble-resin binder is a sheet for ink jet record given in [7] characterized by being poly vinyl alcohol.

[0024] [10] A molding side is the film which has the Takahira glide plane, a laminated paper, glassine, inorganic glass, and a sheet for ink jet record given in [8] that is a surface of metal. TO.

[0025]

[Embodiment of the Invention] It is the description to contain the colloidal particle which this invention establishes an ink absorbing layer in sheet-like base materials, such as paper and a film, and this ink absorbing layer has the lamination of one or more layers, and has mean diameter at least 300nm or less, and cationic resin in the same layer.

Especially a colloidal particle has a desirable anionic colloidal particle. When a colloidal particle is anionic, the selection width of face of a pigment is wide, and the sheet for ink jet record with good color enhancement, highly humid shelf-life, and ink absorptivity and

glossiness is obtained. The sheet for ink jet record of this invention has high gloss, and has outstanding color enhancement, highly humid shelf-life, and ink jet record (printing) fitness, high printing concentration, and a water resisting property.

[0026] As a base material, sheets, such as papers, such as films, such as cellophane, polyethylene, polypropylene, plasticized polyvinyl chloride, rigid polyvinyl chloride, and polyester, paper of fine quality, art paper, coat paper, cast coated paper, a metallic paper, kraft paper, a polyethylene laminated paper, an impregnated paper, vacuum evaporationo paper, and water-soluble paper, metal foil, and a synthetic paper, are used suitably, for example.

[0027] it may come out further, and there may be an ink absorbing layer of this invention, or may be a multilayer. First, the layer containing a colloidal particle and cationic resin is explained.

[0028] Although a colloidal particle will not be limited especially if mean particle diameter is below 300nm (the particle size of a colloidal particle expresses BET particle size unless it refuses BET mean particle diameter and especially the following), it is usually 1-200nm in diameter in many cases. A colloidal particle gives the colloidal solution (solution with which a particle does not sediment even if a particle is detailed and carries out long duration neglect), and a particle is accepted by the ultramicroscope or the electron microscope. However, there are some which show the property as colloid also with the mean particle diameter to about 500nm. The Tyndall phenomenon is known as a property of the colloidal solution.

[0029] The colloidal particle used for this invention can illustrate organic anionic colloidal particles, such as inorganic Nonion nature colloidal particle; styrene, such as inorganic cationic colloidal particle; calcium carbonates, such as inorganic anionic colloidal particle; mullite (alumina silicate) sols, such as colloidal silica, a smectite, a zeolite, clay, tin oxide, and a zinc oxide, alumina sols (pseudo-boehmite etc.), and cation denaturation colloidal silica, and a kaolin, and acrylic. Clay, a calcium carbonate, and a kaolin distribute by the mechanical approach of a supersonic wave, a ball mill, etc., and obtain the secondary particle of a micron unit. Especially, glossiness and color enhancement to anionic colloidal silica is good. Especially in order to obtain a feeling of gloss, and printing concentration, the mean particle diameter of 20-200nm is desirable. Printing concentration falls remarkably and is not desirable if the particle size of a colloidal particle exceeds 300nm.

[0030] A colloidal particle is a dispersing element with a small particle size. In order to make the particle of micron order into the colloidal particle of nanometer order, it distributes under existence of a dispersant preferably (a supersonic wave, a sand mill, ball mill, etc.). Colloidal silica and alumina sol are the colloidal particles which grew from the molecule nucleus.

[0031] This invention may add the pigment of other secondary particles in a colloidal particle in the range which does not check effectiveness. For example, the various pigments of well-known official business are suitably used in the common coated paper fields, such as a synthetic amorphism silica, a kaolin, clay, baking clay, a zinc oxide, tin oxide, magnesium sulfate, an aluminum oxide, an aluminum hydroxide, a calcium carbonate, a satin white, aluminum silicate, a smectite, a zeolite, a magnesium silicate, a magnesium carbonate, magnesium oxide, diatomaceous earth, a styrene system plastics pigment, a urea-resin system plastics pigment, and a benzoguanamine system plastics

pigment. However, in order to maintain the smooth nature and transparency of a coating layer, as for the amount of other pigments used, it is desirable to adjust to 20% or less to a colloidal particle.

[0032] Although not limited especially as cationic resin, polyalkylene polyamine, such as a polyethylene amine and polypropylene polyamine, or the derivative of those, the acrylic resin that has the 3rd class amino group and the 4th class ammonium, a JIAKURIRU amine, etc. can be illustrated, for example. in addition -- as the addition of cationic resin - - the colloidal particle 100 section -- receiving -- 0.5 - 20 weight section -- it is more preferably adjusted in the range of 1 - 10 weight section. If there are many amounts of cationic resin, a colloidal particle and cationic resin do not happen and have desirable condensation. On the other hand, if there are few amounts of cationic resin, the ink fixing amelioration effectiveness and the waterproof amelioration effectiveness after printing may not be acquired enough.

[0033] When colloidal particles are Nonion and a cation, blending with cation resin simply is possible, but since membrane formation nature is inadequate, it is desirable to add adhesives further all over an ink absorbing layer. As adhesives (binder), they are conventionally used by the well-known adhesives (binder) used for common coated paper, such as vinyl system polymer latexes, such as a conjugated diene system polymer latex of cellulosics, such as polyvinyl alcohol or its denaturation object, casein, soybean protein, synthetic protein, starch, a carboxymethyl cellulose, and methyl cellulose, a styrene-butadiene copolymer, and a methyl methacrylate-butadiene copolymer, an acrylic polymer latex, and an ethylene-vinylacetate copolymer, for example, adding suitably.

[0034] On the other hand, when a colloidal particle is anionic, shortly after adding cation resin, application liquid condenses in many cases. When a colloidal particle condenses, a feeling of ZARATSUKI is in a paint film, and there is a possibility that smooth nature may also be large and may fall, not to mention transparency. In the desirable mode of this invention, cationic resin is added, after mixing water soluble polymer adhesives (cellulosics, such as polyvinyl alcohol or its denaturation object, casein, soybean protein, synthetic protein, starch, a carboxymethyl cellulose, and methyl cellulose etc.) in the anionic colloidal solution and making it stick to the front face of an anionic colloidal particle. It turned out that a homogeneity dispersing element is obtained, without a colloidal particle condensing by this. There is not only effectiveness which prevents condensation, but water soluble resin can expect the binder effectiveness. In especially this invention, polyvinyl alcohol and its denaturation object (Following PVA is called) are effective.

[0035] Although especially the solid content weight ratio of a colloidal particle and adhesives does not limit, 4 / 1 - 50/1 are desirable, and it is more preferably adjusted in the range of 20 / 3 - 40/1. When there are many additions of adhesives, the opening between colloidal particles is taken up and there is a possibility that ink rate of absorption may fall. On the other hand, if there are too few additions of adhesives, a big crack may arise all over an ink absorbing layer, and the feeling of transparency of an ink absorbing layer may be spoiled remarkably.

[0036] In addition, various assistants, such as the dispersant used in common coated paper manufacture, a thickener, a defoaming agent, a coloring agent, an antistatic agent, and antiseptics, are added suitably.

[0037] although especially the amount of desiccation applications of the layer containing

a colloidal particle and cationic resin is not what is limited -- 1 - 80 g/m² -- desirable -- 5 - 50 g/m² It adjusts. If there are few amounts of coating, even if many [conversely], effectiveness is saturated and it is [that it is easy to produce a crack in a paint film] meaningless. For example, 15 g/m² In order to obtain the above amount of high applications, it is realizable with two applications or more in addition to thickening of application liquid, and high-concentration-izing.

[0038] Although it may be constituted by only the layer (a multilayer is sufficient) in which an ink absorbing layer contains a colloidal particle and cationic resin although the layer which contains a colloidal particle and cationic resin above was explained, generally the particle interspace spare time of the ink absorbing layer which was able to obtain whether the colloidal particle itself would have pore since it was very small is very small. In order to make the layer containing a colloidal particle and cationic resin also absorb the ink of a high concentration part completely, it is necessary to make [many] the amount of applications of an ink absorbing layer. The high ink rate of absorption which the amount of applications of a colloidal particle content layer prepares other ink absorbing layers, and makes the purpose of this invention at least, high printing concentration, color enhancement, high gloss, printing fitness, and a water resisting property can obtain the good sheet for ink jet record. However, in order to maintain the gloss after printing, and a feeling of gloss, it is desirable to be adjusted to the whole ink absorbing layer in the range whose amount of desiccation applications of the layer containing a colloidal particle and cationic resin is 50 - 100 % of the weight. Although fixed gloss will be acquired if there are few amounts of coating of a colloidal particle and a cationic resin content layer, about the same gloss as a photograph and a feeling of gloss are hard to be obtained. However, when preparing other ink absorbing layers, in order to acquire glossiness, it is desirable to make the layer containing a colloidal particle and cationic resin into the maximum upper layer.

[0039] Next, other ink absorbing layers are explained concretely. The various pigments of well-known official business are suitably used in the common coated paper fields, such as a non-[synthetic] fixed form silica described above as a pigment used for other ink absorbing layers, clay, an alumina, and a smectite. From viewpoints, such as printing concentration, a silica and an alumina are used preferably. As adhesives (binder), binders, such as above mentioned PVA and casein, and starch, can be used. although especially the addition of adhesives is not limited -- the pigment 100 weight section -- receiving -- the 5 - 150 weight section -- it is preferably adjusted in the range of 10 - 50 weight section. Moreover, cationic resin, such as an amine system, can be added and it can improve ink fixable further. in addition -- as the addition of cationic resin -- the pigment 100 weight section -- receiving -- 1 - 30 weight section -- it is more preferably adjusted in the range of 5 - 20 weight section. In addition, various assistants, such as the dispersant used in common coated paper manufacture, a thickener, a defoaming agent, a coloring agent, an antistatic agent, and antiseptics, are also added suitably.

[0040] Although especially the amount of applications of other ink absorbing layers is not limited, it is desirable to be adjusted to 3 - 30 g/m².

[0041] the case where which ink absorbing layer is prepared -- as an application coating machine -- various kinds, such as a blade coating machine, an air knife coater, a roll coater, a bar coating machine, a gravure coating machine, a rod blade coating machine, a lip coating machine, a curtain coating machine, and a slit-die coating machine, -- well-

known application equipment is mentioned.

[0042] An ink absorbing layer (a colloidal particle content layer and the other ink absorbing layer are included) can be formed with application equipment on a base material. Moreover, an ink absorbing layer is formed in a molding side, an adhesive or adhesive interlayer is prepared in a base material (or ink absorbing layer), an interlayer and an ink absorbing layer (or base material) can be pasted up, and an ink absorbing layer can be prepared by exfoliating only a molding side. Thus, if an ink absorbing layer is formed using a molding side, the more excellent glossiness will be acquired. Next, application membrane formation of the ink absorbing layer is carried out in a molding side, an adhesive or adhesive interlayer is prepared in a base material, the case where lamination and a molding side are exfoliated is explained so that an ink absorbing layer and an interlayer may meet, but also when preparing an interlayer in an ink absorbing layer, it can carry out according to this.

[0043] As the adhesion approach, the laminating method (the laminating methods, such as the dry laminate method, the wet laminating method, the hot melt laminating method, and the extrusion laminating method, are mentioned) can be illustrated. By a wet lamination, dry laminate, and the hot melt laminating method, adhesive resin (thermoplastics) and adhesives are applied to a base material, an interlayer is prepared, after carrying out lamination ***** so that an interlayer and an ink absorbing layer may meet, a molding side is removed and the desired sheet for ink jet record is obtained. By the extrusion laminating method, the polyethylene (the same approach is used also when using other resin) by which heating melting was carried out at 280-320 degrees C into the melting extruder is poured on the surface of a base material, after carrying out cooling sticking by pressure with the molding object and lamination which have an ink absorbing layer, and a cooling roll, a molding object is removed and the desired sheet for ink jet record is obtained.

[0044] When using a pressure sensitive adhesive (binder) as the middle class, after using various kinds of application approaches, such as a bar coating machine, a roll coater, and a lip coating machine, and carrying out application desiccation at a base material, a molding side can be removed from an ink absorbing layer and ***** , and the desired record sheet for ink jets can be obtained.

[0045] An interlayer's amount of applications is 2 - 50 g/m², even when using any of thermoplastics, adhesives, and a pressure sensitive adhesive, although it does not limit especially if an ink absorbing layer and a base material can be pasted up. It is adjusted so that it may become. If there are few amounts of applications, sufficient adhesive strength is hard to be obtained, on the other hand, even if many, effectiveness is saturated, and it is meaningless.

[0046] as the giant-molecule resin used for the middle class -- thermoplastics (for example, : -- ethyl cellulose --) Vinyl acetate resin and its derivative, polyethylene, an ethylene-vinyl acetate copolymer, Polyvinyl alcohol, acrylic resin, polystyrene, and its copolymer, A polyisobutylene, hydrocarbon resin, polypropylene, polyamide resin, The thermoplastics of various well-known official businesses, such as polyester resin, is mentioned. adhesives (thermosetting resin, such as a urea-resin, phenol resin, an epoxy resin, and Pori isocyanate resin, --) Polyvinyl acetal/phenol resin, rubber/phenol resin, Rubber radical adhesives, such as compound polymer mold adhesives, such as epoxy/Nylon, and a latex former rubber radical, The adhesives of various well-known

official businesses, such as hydrophilic naturally-occurring-polymers adhesives, such as starch, glia, and casein, are mentioned. A pressure sensitive adhesive (the pressure sensitive adhesive of various well-known official businesses, such as a solvent mold pressure sensitive adhesive, an emulsion mold pressure sensitive adhesive, a hot melt mold pressure sensitive adhesive, and a delay DOTAIPU pressure sensitive adhesive, is mentioned) is used suitably.

[0047] The plates which have high smooth front faces, such as sheets, such as papers, such as films, such as the cellophane which has high surface smooth nature, polyethylene, polypropylene, plasticized polyvinyl chloride, rigid polyvinyl chloride, and polyester, a polyethylene laminated paper, glassine, an impregnated paper, and vacuum evaporationo paper, metal foil, and a synthetic paper, and inorganic glass, a metal, and plastics, as an ingredient used for a molding side are used suitably. Especially, the high polymer film from viewpoints, such as application fitness and the exfoliation fitness of a molding side and an ink absorbing layer, a polyethylene (polyethylene, polypropylene, polyester, etc.) laminated paper, glassine, and inorganic glass are desirable.

[0048] The smoother one of a molding side is desirable in respect of glossiness, 0.5 micrometers or less of Ra are [the surface roughness (JISB 0601) of a molding side] desirable, and Ra is 0.05 micrometers or less more preferably.

[0049] Although no to process is still possible for a molding side, in order to improve the detachability of a molding side and an ink absorbing layer, it may apply and use the resin which has the detachability of silicone, a fluororesin, etc. for the application side of a molding side. In order to improve printing fitness, it is also effective in a molding side to perform surface hydrophilization by corona discharge or plasma treatment.

[0050] The application process of the ink absorbing layer when imprinting to a base material through an interlayer is contrary to a general application process. That is, the maximum upper layer of an ink absorbing layer is previously applied to a molding side, the 2nd layer is applied on it, and the ink absorbing layer of further others is applied. The ink absorbing layer of the sheet for ink jet record obtained by imprinting to a base material becomes the order of the maximum upper layer, the 2nd layer, and other ink absorbing layers.

[0051] 20% or less of the moisture content of the ink absorbing layer when imprinting to a base material through an interlayer is desirable. It adjusts to 10% or less more preferably. Although a reason is not certain, if many moisture is contained, the adhesive strength between a molding side and an ink absorbing layer is strong, when the adhesive strength becomes higher than the reinforcement between layers between ink absorbing layers and a molding side is removed, between the layers of an ink absorbing layer exfoliates, an ink absorbing layer remains in a molding side, and the desired sheet for ink jet record may not be obtained.

[0052] The solvent object for dissolving or distributing the coloring matter and this coloring matter for forming an image as ink used by the ink jet record approach of this invention is used as an indispensable component, and if needed, the dissolution or a distributed stabilizing agent of various dispersants, a surfactant, a viscosity controlling agent, a specific resistance regulator, pH regulator, an antifungal agent, and a record agent etc. is added, and it is adjusted.

[0053] Although direct dye, acid dye, basic dye, reactive dye, a food color, a disperse dye, fat dye, various pigments, etc. are raised as a record agent used for ink, a well-

known thing can be conventionally used especially without a limit. Although the content of such coloring matter is determined depending on the class of solvent body constituent, the property required of ink, there is especially no problem at use to which it becomes as [combination / in conventional ink], i.e., about 0.1 - 20% of the weight of a rate, also in the ink in this invention.

[0054] As a solvent of the ink used by this invention, water and water-soluble, various organic solvents, For example, methyl alcohol, ethyl alcohol, n-propyl alcohol, The alkyl alcohols of the carbon numbers 1-4, such as isopropyl alcohol, n-butyl alcohol, and isobutyl alcohol, A ketone or ketone alcohol, such as an acetone and diacetone alcohol, Polyalkylene glycols, such as a polyethylene glycol and a polypropylene glycol Ethylene glycol, a polo pyrene glycol, a butylene glycol, Triethylene glycol, thioglycol, hexylene glycol, Alkylene groups, such as a diethylene glycol, 2-6 alkylene glycol Ether, such as amides, such as dimethylformamide, and a tetrahydrofuran, The low-grade alkyl ether of polyhydric alcohol, such as a glycerol, ethylene glycol methyl ether, the diethylene-glycol methyl (ethyl) ether, and the triethylene glycol monomethyl ether, is mentioned.

[0055]

[Example] Although an example is given to below and this invention is explained more concretely, of course, it is not limited to these. Moreover, unless it refuses, the section in an example and especially % are the solid content except water, and show weight section and weight %, respectively. After processing all the sheets for ink jet record obtained by this invention by the supercalender (linear pressure: 50 kg/cm), they were used for evaluation.

[0056] anionic colloidal silica (the Nissan chemistry company make --) with example 1 mean particle diameter of 65nm trade name: -- the Snow tex YL100 section -- PVA (the Kuraray Co., Ltd. make --) Trade name :P VA-117, polymerization degree : in 15% water solution which mixed the ten sections :98.5% whenever [1700 and saponification] as cationic resin -- a polyethylene polyamine dicyandiamide condensate (Japanese flower chemistry company make --) trade name: -- the neo fix E-1173 section is added, and after distributing, the amount of applications serves as 20 g/m² by MEIYABA -- as -- commercial coated paper (new Oji Co., Ltd. make --) trade name: -- O.K. coat, 127.9g/m² -- a lamination (what laminated 15micro polyethylene on the coated paper front face by the EKUSUTORUJUN laminating method --) Although lamination coated paper was called below and carried out, application desiccation was carried out in the lamination side, and the sheet for ink jet record of this invention was manufactured.

[0057] anionic colloidal silica (the Nissan chemistry company make --) with example 2 mean particle diameter of 85nm trade name: -- the Snow tex ZL100 section -- PVA (the Kuraray Co., Ltd. make --) the inside of 15% water solution which mixed the trade name-VA-117 12 section -- as cationic resin -- a polyethylene polyamine dicyandiamide condensate (Japanese stain-ized industrial company make --) Trade name :P The amount of applications is 20 g/m² at MEIYABA like [after adding the AP-13 section and distributing] an example 1. Application desiccation was carried out on the front face of lamination coated paper so that it might become, and the sheet for ink jet record of this invention was manufactured.

[0058] anionic colloidal silica (the Nissan chemistry company make --) with example 3 mean particle diameter of 45nm trade name: -- the 20LSnow tex 100 section -- PVA (the Kuraray Co., Ltd. make --) the inside of 15% water solution which mixed the trade name-

VA-1178 section -- as cationic resin -- a polyethylene polyamine dicyandiamide condensate (Japanese stain-ized industrial company make --) Trade name :P The amount of applications is 20 g/m² at MEIYABA after adding the AP-13 section and distributing. Application desiccation was carried out on the front face of lamination coated paper so that it might become, and the sheet for ink jet record of this invention was manufactured. [0059] anionic colloidal silica (the Nissan chemistry company make --) with example 4 mean particle diameter of 15nm trade name: -- the Snow tex 30 100 section -- PVA (the Kuraray Co., Ltd. make --) the inside of 15% water solution which mixed the trade name-VA-117 18 section -- as cationic resin -- a polyethylene polyamine dicyandiamide condensate (Japanese stain-ized industrial company make --) Trade name :P The amount of applications is 20 g/m² at MEIYABA after adding the AP-13 section and distributing. Application desiccation was carried out on the front face of lamination coated paper so that it might become, and the sheet for ink jet record of this invention was manufactured. [0060] anionic colloidal silica (the Nissan chemistry company make --) with example 5 mean particle diameter of 150nm trade name: -- the Snow tex MP-2040 100 section -- PVA (the Kuraray Co., Ltd. make --) the inside of 15% water solution which mixed the trade name-VA-117 15 section -- as cationic resin -- a polyethylene polyamine dicyandiamide condensate (Japanese stain-ized industrial company make --) Trade name :P The AP-13 section was added, after distributing, application desiccation was carried out on the front face of lamination coated paper so that the amount of applications might serve as 20 g/m² by MEIYABA, and the sheet for ink jet record of this invention was manufactured.

[0061] anionic colloidal silica (the Nissan chemistry company make --) with example 6 mean particle diameter of 45nm trade name: -- the 20LSnow tex 100 section -- PVA (the Kuraray Co., Ltd. make --) 15% water solution which mixed the trade name-VA-117 10 section -- as cationic resin -- a polyethylene polyamine dicyandiamide condensate (Japanese flower chemistry company make --) Trade name: The amount of applications is 20 g/m² at MEIYABA after adding the neo fix E-1173 section and distributing.

Application desiccation was carried out at the PET detachability film (SANE chemical-industry company make, trade name:RFM-50, and Ra are 0.05 micrometers or less) used as a molding side so that it may become. Next, the amount of applications is acrylic ester adhesives (the Nippon Carbide Industries [Co., Inc.] make, a trade name: A-02) to the front face of lamination coated paper 10 g/m² Application desiccation was carried out so that it might become. Then, it was stuck by pressure in the calender of ***** and linear pressure 50 kg/cm so that the above-mentioned ink absorbing layer might meet adhesives. Then, the PET film was removed and the sheet for ink jet record of this invention was manufactured.

[0062] anionic colloidal silica (the Nissan chemistry company make --) with example 7 mean particle diameter of 45nm trade name: -- the 20LSnow tex 100 section -- PVA (the Kuraray Co., Ltd. make --) 15% water solution which mixed the trade name-VA-1178 section -- as cationic resin -- a polyethylene polyamine dicyandiamide condensate (Japanese flower chemistry company make --) Trade name: The amount of applications is 5g/m² at MEIYABA after adding the neo fix E-1173 section and distributing.

Application desiccation was carried out at the PET film (the Toray Industries [, Inc.] make, 75micro, a trade name: Lumiler T, surface roughness Ra=0.02micrometer) used as a molding side so that it may become. next, anionic colloidal silica (the Nissan chemistry

company make --) with a mean particle diameter of 85nm trade name: -- the Snow tex ZL100 section -- PVA (the Kuraray Co., Ltd. make --) 15% water solution which mixed the trade name-VA-117 10 section -- as cationic resin -- a polyethylene polyamine dicyandiamide condensate (Japanese flower chemistry company make --) Trade name: The amount of applications is 15 g/m² at MEIYABA to the coating layer above-mentioned after adding the neo fix E-1175 section and distributing. Application desiccation was carried out so that it might become. Next, the amount of applications is acrylic ester adhesives (the Nippon Carbide Industries Co., Inc. make, trade name:floor line-3000A) to a coating layer front face 10 g/m² Application desiccation was carried out so that it might become. Then, it was stuck by pressure in the calender of ***** and linear pressure 50 kg/cm so that adhesives and a lamination coated paper front face might be met. Then, the PET film was removed and the sheet for ink jet record of this invention was manufactured.

[0063] anionic colloidal silica (the Nissan chemistry company make --) with example 8 mean particle diameter of 65nm trade name: -- the Snow tex YL100 section -- PVA (the Kuraray Co., Ltd. make --) 15% water solution which mixed the trade name-VA-117 10 section -- as cationic resin -- a polyethylene polyamine dicyandiamide condensate (Japanese flower chemistry company make --) Trade name: The amount of applications is 15g/m² at MEIYABA after adding the neo fix E-1175 section and distributing.

Application desiccation was carried out at the PET film (the Toray Industries [, Inc.] make, 75micro, a trade name: Lumiler T, surface roughness Ra=0.02micrometer) used as a molding side so that it may become. Next, on the above-mentioned application layer, application desiccation of the 15% water solution which mixed the PVA(Kuraray Co., Ltd. make, trade name-VA-117)40 section and the cation resin 20 section (the Sumitomo Chemical [Co., Ltd.] make, a trade name: violet gap gin 1001) in the synthetic silica (trade name by Tokuyama, Inc.: fine seal X-45) 100 section with a particle diameter of 4.5micro was carried out so that the amount of applications might become with 5 g/m² by MEIYABA. Next, the amount of applications is acrylic ester adhesives (the Nippon Carbide Industries [Co., Inc.] make, a trade name: A-02) to the above-mentioned lamination coated paper front face 15 g/m² Application desiccation was carried out so that it might become. Then, it was stuck by pressure in the calender of ***** and linear pressure 50 kg/cm so that an adhesive coated surface and a coating layer front face might meet. Then, the PET film was removed and the sheet for ink jet record of this invention was manufactured.

[0064] The sheet for ink jet record of this invention was manufactured like the example 1 except changing PVA of example 9 example 1 into the hydroxypropyl methylcellulose (the Shin-Etsu Chemical Co., Ltd. make, trade name:METOROZU 60SH).

[0065] The sheet for ink jet record of this invention was manufactured like the example 1 except changing the anionic colloidal silica of example 10 example 1 into cation denaturation colloider RUSHIRI (the Nissan chemistry company make, a trade name: Snow tex AK-YL) of 65nm of mean diameters.

[0066] The amount of applications is 15% water solution which mixed the PVA(Kuraray Co., Ltd. make, trade name-VA-117)10 section in the cation denaturation colloidal silica (Nissan chemistry company make trade name: Snow tex AK-YL) 100 section with example of comparison 1 mean particle diameter of 65nm at MEIYABA 20g/m² Application desiccation was carried out on the front face of lamination coated paper so

that it might become, and the sheet for ink jet record was manufactured.

[0067] The amount of applications is 15% water solution which mixed the PVA(Kuraray Co., Ltd. make, trade name-VA-117)10 section in the anionic colloidal silica (Nissan chemistry company make, Snow tex YL) 100 section with example of comparison 2 mean particle diameter of 65nm at MEIYABA 20 g/m2 Application desiccation was carried out on the front face of lamination coated paper so that it might become, and the sheet for ink jet record was manufactured.

[0068] In the anionic colloidal silica (Nissan chemistry company make) 100 section with example of comparison 3 mean particle diameter of 400nm 15% water solution of the PVA(Kuraray Co., Ltd. make, trade name-VA-117)15 section -- as cationic resin -- a polyethylene polyamine dicyandiamide condensate (Japanese flower chemistry company make --) Trade name: The amount of applications is 20 g/m2 at MEIYABA after adding the neo fix E-1173 section and distributing. Application desiccation was carried out on the front face of lamination coated paper so that it might become, and the sheet for ink jet record was manufactured.

[0069] In the example of comparison 4 composition silica (trade-name:fine seal [the Tokuyama make,] X-45 mean particle diameter: 4.5micro) 100 section 15% water solution of the PVA(Kuraray Co., Ltd. make, trade name-VA-117)30 section -- as cationic resin -- a polyethylene polyamine dicyandiamide condensate (Japanese flower chemistry company make --) Trade name: The amount of applications is 20 g/m2 at MEIYABA after adding the neo fix E-117 15 section and distributing. Application desiccation was carried out on the front face of lamination coated paper so that it might become, and the sheet for ink jet record was manufactured.

[0070] 10% water solution of example of comparison 5PVA (the Kuraray Co., Ltd. make, trade name-VA-117) is used, and the amount of applications is 15 g/m2 at MEIYABA. Application desiccation was carried out on lamination coated paper so that it might become, and the sheet for ink jet record was manufactured.

[0071] In the example of comparison 6 composition silica (trade-name:fine seal [the Tokuyama make,] X-45 mean particle diameter: 4.5micro) 100 section 15% water solution of the PVA(Kuraray Co., Ltd. make, trade name-VA-117)30 section -- as cationic resin -- a polyethylene polyamine dicyandiamide condensate (Japanese flower chemistry company make --) Trade name: The amount of applications is 15 g/m2 at MEIYABA after adding the neo fix E-117 15 section and distributing. Application desiccation was carried out on the front face of commercial paper of fine quality (the product made from FUJI XEROX, trade-name:L paper, the U.S. tsubo: 64g/m2) so that it might become. the cation denaturation colloidal silica (the Nissan chemistry company make --) whose mean diameter is 65nm Trade name: Snow tex After adjusting 15% water solution of the AK-YL100 section and the PVA(Kuraray Co., Ltd. make, trade name-VA-117)10 section, by the roll coater Amount of desiccation coating 3 g/m2 It prepared on the above-mentioned coating layer with the cast approach (art which sticks to the mirror plane roll which carried out coating of the application liquid to the above-mentioned coating layer front face, and was heated by the skin temperature of 90 degrees C after 2 seconds by pressure, and is dried) so that it might become, and the sheet for ink jet record was manufactured.

[0072] The approach shown below estimated the water resisting property of the ink jet record form sheet obtained in the [evaluation approach] examples 1-8 and the examples

1-6 of a comparison, highly humid shelf life, absorptivity, color enhancement, etc. As an ink jet printer for evaluation, it is commercial Desk. Jet 560J (H.P. shrine make) were used.

[0073] Waterdrop was dropped on the record sheet for [waterproof] ink jets, waterdrop was wiped off after 30 minutes, the part immersed in waterdrop was rubbed by hand, and four steps of water resisting properties were evaluated.

O : change was not seen at all by the ink acceptance layer.

O : the ink acceptance layer was able to be taken slightly.

**: The ink acceptance layer was able to be taken partially.

x: The ink acceptance layer was able to be taken completely.

[0074] The sheet which carried out [highly humid shelf-life] printing was saved for seven days at 40 degrees C and 95% of highly humid room, and the blot of ink was evaluated.

O : there was no blot.

O : it spread slightly.

**: The blot was large.

x: It spread completely.

[0075] Evaluation of [ink absorptivity] ink absorptivity observes whether lamination and ink imprint paper of fine quality to paper of fine quality to the printing side printed every 5 seconds from immediately after printing. Time amount until it stops imprinting at all is measured. The thing for 10 or less seconds excels [time amount / until ink dries less than / O:5 second / O:5 which evaluated four steps of measured numbers of seconds - 10 second **:10 - 30 second x:30 seconds or more] in ink absorptivity.

[0076] The printing concentration of the [printing concentration] black solid section was measured using the Macbeth reflection density meter (Macbeth, RD-920). The figure shown in front Naka is the average of 5 times measurement.

[0077] The feeling of gloss of the [feeling of gloss of the printing section (feeling of gloss)] printing section was viewed from the horizontal include angle of 20 degrees to the printing section, and was evaluated four steps as follows.
O: There is a feeling of gloss of color photography and this level.

O : although it is inferior to color photography, there is a high feeling of gloss.

: Printing ** of coated paper.

x: General PPC ****.

[0078] Dropping desiccation of black, cyanogen, a Magenta, and the yellow ink is carried out at the [color-enhancing] white PET top, and it compares with the obtained color.

O : -- **: from which the almost same color was obtained -- [0079] from which x:color from which the color was shifted somewhat was shifted sharply

[Table 1]

[0080]

[Effect of the Invention] The sheet for ink jet record obtained by the configuration of this invention has color enhancement, highly humid shelf life, a water resisting property, and good ink absorptivity, and after ink acceptance has high-glossiness and high printing concentration so that clearly from Table 1.